

Factors Related to Rapid Weight Loss Practices among International-style Wrestlers

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ABSTRACT

ALDERMAN, B. L., D. M. LANDERS, J. CARLSON, and J. R. SCOTT. Factors Related to Rapid Weight Loss Practices among International-style Wrestlers. *Med. Sci. Sports Exerc.*, Vol. 36, No. 2, pp. 249–252, 2004. **Purpose:** The deaths of three intercollegiate wrestlers in 1997 prompted the NCAA and governing bodies that oversee high school sports to adopt new policies prohibiting unsafe weight loss practices. Similar policies have not yet been adopted for international style wrestling, a style that attracts thousands of youth once the regulated scholastic season is over. Therefore, this study examined the rapid weight loss practices in high school wrestlers participating in international style wrestling. To do this, rapid weight gain (RWG), an index that reflects the degree of rapid weight loss (RWL), was examined. **Methods:** Wrestlers ($N = 2638$) participating in the 1997 and 1998 National wrestling championships were randomly selected to be weighed at matside with electronic scales. The methods wrestlers used to accomplish weight loss were also assessed in a subsample of wrestlers. **Results:** Wrestlers gained an average of 3.4 kg, which represents a 4.81% gain of body weight. The range across weight classes and age groups was -2.68 kg (-2.1% loss of body weight) to $+16.73$ kg (13.4% gain of body weight). No differences in RWG existed as a function of the represented state teams. In addition, wrestlers who were older and more successful (i.e., placers) gained significantly more weight than their younger and less successful counterparts ($P < 0.001$). Excessive running, using saunas, and wearing vapor-impermeable suits were cited as the most common methods used to achieve RWL. **Conclusion:** These results suggest that RWL still exists in international style wrestling, and similar policies to those recently instituted by the NCAA are warranted. **Key Words:** WEIGHT LOSS, INTERNATIONAL STYLE WRESTLING, RAPID WEIGHT GAIN, DEHYDRATION, EATING DISORDERS

A great deal of concern has recently been generated over the rapid weight loss (RWL) techniques employed by competitive wrestlers. The tragic deaths of three intercollegiate wrestlers in 1997 prompted the NCAA to develop and institute new policies prohibiting unsafe weight loss practices. Similar policies have also been adopted by governing bodies that oversee high school sports. However, similar policies have not yet been adopted for international style wrestling (i.e., freestyle and Greco-Roman), a style of wrestling that attracts thousands of youth and high school wrestlers once the regulated scholastic season is over. In light of this, it is important to recognize that these RWL techniques may adversely affect one's physical and mental health, and may potentially lead to death.

Wrestlers have employed RWL strategies for decades in an attempt to gain strength and leverage over an opponent (8).

Professional organizations have expressed concern regarding these practices and have published position statements in an attempt to minimize these behaviors (1,2,4). However, a study investigating the magnitude of rapid weight gain (RWG), a measure that reflects the degree of RWL, among wrestlers participating in the 1992 NCAA Championships (12) found that wrestlers lost an average of 3.73 kg in a relatively short amount of time, findings that call into question the effectiveness of these position statements.

In the wake of the tragedies in 1997, the NCAA instituted new rule changes that included the establishment of new weight classes, a weight class certification process, and decreasing the time between the weigh-in and actual competition. In addition, traditional dehydration techniques (e.g., vapor-impermeable suits, saunas, and excessive running to achieve weight loss) were also banned. Rules committees that oversee and regulate high school sports instituted similar prohibitive measures. Scott et al. (12) determined that these new rule changes were effective in reducing RWG during the 1999 NCAA Championships to 0.66 kg. Several studies (6,16) have also examined the impact of the new NCAA Wrestling Weight Certification program on RWL and have concluded that these new rules have been effective in breaking the historic cycle of RWL among wrestlers.

U.S. Wrestling, the national governing body for amateur international style wrestling, also instituted rules on weight

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management, including banning RWL practices. However, the rules in international style wrestling do not include moving the weigh-in process closer to the time of competition. It is possible that the effectiveness of the NCAA and regulated scholastic policies rely on moving the weigh-in process closer to match time to discourage wrestlers from losing too much weight in fear they may not have sufficient time to rehydrate and refeed before competition. It is also possible that international style wrestlers are engaging in RWL practices outside of the sanctioned event sites. Therefore, determining the prevalence of RWL practices among wrestlers competing in international style wrestling along with delineating the possible techniques they use to lose weight is vital in guiding intervention programs and effective policy making.

The purpose of the present study was twofold: (a) to examine the prevalence of RWL practices among high school wrestlers participating in international style wrestling by age, weight class, representative state team, and wrestling performance (i.e., placers vs nonplacers); and (b) to examine the type of weight loss techniques practiced by a subsample of these wrestlers. Given the limited enforcement of rules for international style wrestling, it was hypothesized that wrestlers would engage in similar amounts of RWL typically reported for collegiate and high school wrestlers before the implementation of the new rule changes. Due to the relative paucity of research examining RWL practices as a function of age, weight class, representative state team, and performance, no directional hypotheses were forwarded.

METHOD

Participants and procedures. Participants ($N = 2638$) consisted of wrestlers from 46 states who were participating in the 1997 and 1998 Cadet and Junior National Freestyle/Greco-Roman Wrestling Championships. Cadet (i.e., 15- to 16 yr-olds) and Junior (i.e., 17- to 18-yr-olds) wrestlers were randomly selected to be weighed at matside throughout the tournaments. In addition, all final round wrestlers (i.e., place winners) were weighed at matside before their last competitive match. Seven electronic scales, accurate to 0.11 kg, were used. The magnitude of the weight gain after weigh-ins, which is considered to result from the amount of RWL, is often used as an index to assess compliance with weight management policies in the sport of wrestling (12). For entry into the wrestling competitions, wrestlers and parents both read and signed assent and consent forms, respectively, allowing their weight to be assessed and used for the purpose of establishing new weight loss guidelines in the sport of wrestling.

A subset of wrestlers ($N = 45$) participating in these national wrestling tournaments was selected to complete the weight management practices interview. Neither the school nor the wrestlers' names were included for the interview and anonymity was assured to the parents, coaches, and wrestlers. Participation in this portion of the study by the wrestlers was on a voluntary basis.

TABLE 1. Mean RWG for 1997 and 1998 Cadet and Junior National Wrestling Championships.

	Mean RWG (kg)	SD	N
1997 Cadet freestyle	2.65	1.72	371
1997 Cadet Greco-Roman	2.33	1.67	254
1997 Junior freestyle	3.31	1.79	352
1997 Junior Greco-Roman	3.74	1.71	253
1998 Cadet freestyle	3.27	1.74	363
1998 Cadet Greco-Roman	3.20	1.45	282
1998 Junior freestyle	3.62	1.94	473
1998 Junior Greco-Roman	3.80	1.97	290
Total	3.40	1.83	2638

Weight management practices interview. This structured interview consisted of questions aimed at examining the prevalence of different techniques used to achieve RWL (i.e., running, cycling, swimming, sauna/steam room, exercising in a rubber/plastic warm-up suit, and the use of vomiting, diuretics, and laxatives) along with wrestlers' weight management practices during and between wrestling seasons. Wrestlers were also asked to report the greatest amount of weight they had ever lost to make a weight class and how much weight they typically gained in the off-season. In addition, athletes responded to a series of yes/no questions relating to the incidence of negative side-effects (dizziness in general, dizziness upon standing up, hot flashes, racing heart rate, feverish, nausea, nose bleeds, disorientation, and headaches) that might be attributed to RWL. The weight loss methods used in the current questionnaire were derived from methods used in two previous investigations (9,14) examining weight loss methods in high school and college wrestlers. The weight management practices questionnaire is available by contacting the primary author.

Statistical analysis. Data were managed and statistically analyzed using the Statistical Package for Social Sciences. Frequencies and summary statistics were calculated on all variables. RWL, which is believed to accurately reflect by the amount of rapid weight gain (RWG), was assessed throughout the tournament by taking the difference between the weight at the certified weigh-in and the highest weight gained as assessed before competing at matside. The time from the initial weigh-in to the first matside weigh-in ranged from 3 to 7 h. Dependent samples *t*-tests were used to test any differences in weight gain by age groups, represented state teams, weight classes, and wrestling performance. Finally, the frequency of weight loss practices were calculated from the structured interview.

RESULTS

Results indicate that freestyle and Greco-Roman wrestlers ($N = 1270$ Cadets and 1368 Juniors) gained an average of 3.4 kg, which represents a 4.81% gain of body weight (Table 1). However, the range across weight classes and age groups was -2.68 kg (-2.1% loss of body weight) to $+16.73$ kg (13.4% gain of body weight). No differences in RWG existed as a function of the represented state teams (range of weight gain was 1.9 to 4.5 kg). Placers gained

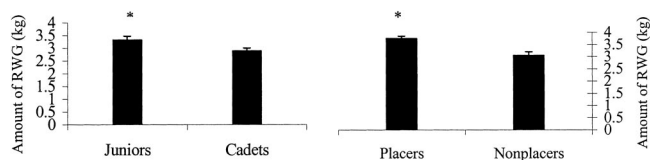


FIGURE 1—Mean RWG differences between Cadets and Juniors and between placers and nonplacers; *RWG among Juniors and placers differed significantly from Cadets and nonplacers, respectively ($P < 0.001$).

significantly more weight (mean = 3.78 kg, range = 2.95–4.77 kg) than the nonplacers (mean = 3.05 kg, range = 1.91–3.59 kg; $t(2636) = 9.07$, $P < 0.001$) (Fig. 1). Wrestlers in the middle weight classes (103.5–167 lb for Cadets and 114.5–191.5 lb for Juniors) gained more weight than wrestlers competing in the lower (83.5–94.5 lb for Cadets and 98–105.5 lb for Juniors) or higher (182.5–242 lb for Cadets and 220–275 lb for Juniors) weight classes. It would be expected that wrestlers competing in higher weight classes (e.g., 242–275 lb) would be able to lose a greater percentage of their body weight than wrestlers competing in the lower weight classes. Remarkably, wrestlers in the 154- to 165-lb weight classes lost the greatest amount of weight. In addition, Juniors gained significantly more weight (mean = 3.59 kg, range = –2.68 to +16.73 kg) than Cadets (mean = 2.91 kg, range = –2.64 to +15.73 kg; $t(2636) = 10.17$, $P < 0.001$).

The data from the weight management practices interview showed that, over the course of their careers, wrestlers reported a maximum weight loss ranging from 0 to 10.23 kg with an average of 5.27 kg. Participants reported gaining an average of 4.83 kg after completing the wrestling season. The following negative side effects of RWL experienced at some point during the season were reported: dizziness (44.4%), headache (46.7%), nausea (42.2%), nosebleeds (20.0%), hot flashes (22.2%), feverish, but not due to sickness (17.8%), disorientation (8.9%), and racing heart rate (4.4%) (Table 2). Participants reported running (91.1%), using saunas (55.6%), exercising in vapor-impermeable warm-up suits (48.9%), swimming (24.4%), cycling (33.3%), and taking laxatives (11.1%) as means used to achieve RWL (Table 3). None of the athletes reported the use of vomiting to attain their target weight.

DISCUSSION

The results of this study indicate that although wrestlers may be prohibited from cutting weight during the regulated

TABLE 2. Percentage of wrestlers ($N = 45$) who have experienced symptoms as a result of RWL.

Symptom	<i>N</i>	%
Dizziness	20	44.4
Hot flashes	10	22.2
Increased HR	2	4.4
Feverish	8	17.8
Nausea	19	42.2
Nose bleeds	9	20.0
Disorientation	4	8.9
Headache	21	46.7

TABLE 3. Percentage of wrestlers ($N = 45$) who have used the following techniques to achieve RWL.

Technique	<i>N</i>	%
Running	41	91.1
Cycling	15	33.3
Swimming	11	24.4
Sauna	25	55.6
Rubber suit	22	48.9
Diuretics	5	11.1

scholastic season, they subsequently engage in RWL during international style wrestling. As determined by matside weigh-in, wrestlers in every weight class and from all 46 represented states were over their respective weight classes. The magnitude of weight gained, which amounts to approximately 5% of body weight, is similar to that of wrestlers competing in the 1992 NCAA championships (mean = 3.73 kg). This was before the implementation of the NCAA weight restrictions that helped reduce the amount of weight gain (mean = 0.66 kg) during the 1999 NCAA championships. Given the physiological and psychological consequences of RWL, similar policies are warranted for international style wrestling.

Wrestlers and coaches justify RWL practices with the belief that it may provide a performance benefit by increasing one's strength and leverage over a smaller opponent. Although substantial evidence exists indicating that extreme weight loss practices commonly employed by wrestlers may result in a variety of physiological and psychological disturbances that could possibly adversely affect performance (3,10,15), no research to date has compared wrestling performance between wrestlers who engage in RWL versus those who do not (11). With regards to performance, impaired performance in grip strength has been reported after RWL in both college (13) and high school (7) athletes. Although it has been suggested that these impairments in grip strength may indicate poorer wrestling ability, many other factors are involved in successful wrestling performances besides grip strength. Our results indicate that more successful wrestlers (i.e., placers) engaged in RWL practices to a greater extent than less successful wrestlers (i.e., nonplacers).

The high school wrestlers in this study reported using a number of strategies to lose weight. The most common strategy to achieve weight loss was excessive running. Swimming and cycling were used by some of the athletes but not to the extent that running was used. The wrestlers also reported using techniques that are banned for high school wrestlers. Exercising in rubber/plastic suits and using saunas are prohibited by wrestling rules. Wrestlers are aware that if they are caught using saunas or rubber/plastic suits, they will be disqualified from the competition. In spite of this, however, the frequency with which these techniques were used was approximately 40–60%. It appears that many of the wrestlers are not taking this rule seriously and are simply finding ways in which to avoid being caught. Future studies investigating the prevalence of RWL after the adoption of policies prohibiting such practices by the NCAA and

high school governing bodies are warranted to determine the effectiveness of these policies.

The wrestlers in this study did not report the use of vomiting, and only a few of them used laxatives to achieve rapid weight loss. The low frequencies reported could be due to an underreporting because it could be argued that wrestlers would not want to willingly report the use of these secretive techniques. Furthermore, it is reasonable to suggest that rapid weight loss methods could have been underreported in this study, because participation in the weight management interview was voluntary and only 45 wrestlers were interviewed. However, the fact that these athletes were willing to report the use of prohibited techniques like saunas and using rubber/plastic suits may suggest that these wrestlers would not be reluctant to report using other prohibited techniques (i.e., use of vomiting, diuretics, and laxatives). In regard to these latter techniques, the results of this study are in accord with other studies that have shown that very few high school wrestlers use vomiting, diuretics, or laxatives to achieve weight loss (5,9).

In conclusion, youth and high school wrestlers competing in international-style wrestling continue to engage in unsafe weight loss practices despite the heightened concern associated with three tragic deaths in 1997. The results indicated that wrestlers gained an average of 3.4 kg, which represents a 4.81% gain of body weight. The range across weight classes and age groups was -2.68 kg (-2.1% loss of body weight) to $+16.73$ kg (13.4% gain of body weight). This magnitude of RWG is similar to that of college wrestlers participating in the 1992 NCAA wrestling championships

before the implementation of the new rule changes that reduced the amount of RWG during the 1999 championships. No differences in RWG existed as a function of the represented state teams. In addition, wrestlers who were older (Juniors) and more successful (placers) gained significantly more weight than their younger (Cadets) and less successful (nonplacers) counterparts, $P < 0.001$. Excessive running, using saunas, and wearing vapor-impermeable suits were cited as the most common methods used to achieve RWL. The findings from the current study indirectly justify the rules imposed by the NCAA and governing bodies that oversee high school sports. The current findings suggest that wrestlers still perceive a benefit to RWL and will engage in such practices given the opportunity. These results illustrate that steps need to be taken to bring international style wrestling in line with weight reduction policies that have recently been instituted at the high school and collegiate levels. It should be noted that during the 2002 U.S. Junior and Cadet National Wrestling Championships, further steps were taken to minimize RWL practices among wrestlers. Specifically, wrestlers were only allowed one opportunity to make their intended weight class. Although the impact of this new rule has yet to be determined, a strong possibility still remains that wrestlers engage in RWL practices outside of the wrestling arena and show up to the weigh-in site at their specified weight in a fasted and/or dehydrated state. Future research is thus warranted to determine the effectiveness of these new policies in preventing unsafe weight loss practices in the wrestling community.

REFERENCES

1. AMERICAN COLLEGE OF SPORTS MEDICINE. Position statement: weight loss in wrestlers. *Med. Sci. Sports Exerc.* 8:xi-xiii, 1976.
2. AMERICAN MEDICAL ASSOCIATION. Wrestling and weight control. *JAMA* 210:131-133, 1967.
3. CHOMA, C. W., G. A. SFORZO, and B. A. KELLER. Impact of rapid weight loss on cognitive function in collegiate wrestlers. *Med. Sci. Sports Exerc.* 30:746-749, 1998.
4. COMMITTEE ON SPORTS MEDICINE AND FITNESS. Promotion of healthy weight-control practices in young athletes. *Pediatrics* 97:752, 1996.
5. DALE, K. S., and D. M. LANDERS. Weight control in wrestling: eating disorders or disordered eating? *Med. Sci. Sports Exerc.* 31:1382-1389, 1999.
6. DAVIS, S. E., G. B. DWYER, K. REED, C. BOPP, J. STOSIC, and M. SHEPANSKI. Preliminary investigation: the impact of the NCAA wrestling weight certification program on weight cutting. *J. Strength Cond. Res.* 16:305-307, 2002.
7. FREISCHLAG, J. Weight loss, body composition, and health of high school wrestlers. *Physician Sportsmed.* 12:121-126, 1984.
8. KENNY, H. E. The problem of making weight for wrestling meets. *J. Health Phys. Educ.* 1:24-25, 49, 1930.
9. KININGHAM, R. B., and D. W. GORENFLO. Weight loss methods of high school wrestlers. *Med. Sci. Sports Exerc.* 33:810-813, 2001.
10. LANDERS, D. M., S. M. ARENT, and R. S. LUTZ. Affect and cognitive performance in high school wrestlers undergoing rapid weight loss. *J. Sport Exerc. Psychol.* 23:307-316, 2001.
11. OPPLIGER, R. A., H. S. CASE, C. A. HORSWILL, G. L. LANDRY, and A. C. SHELTER. American College of Sports Medicine position stand: weight loss in wrestlers. *Med. Sci. Sports Exerc.* 28:ix-xii, 1996.
12. SCOTT, J. R., R. A. OPPLIGER, A. C. UTTER, and C. G. KERR. Body weight changes at the national tournaments: the impact of rules governing wrestling weight management. *Med. Sci. Sports Exerc.* 32:S131, 2000.
13. SERFASS, R. C., G. A. STULL, J. F. ALEXANDER, and J. L. EWING, JR. The effects of rapid weight loss and attempted rehydration on strength and endurance of the handgripping muscles in college wrestlers. *Res. Q. Exerc. Sport* 55:46-52, 1984.
14. STEEN, S. N., and K. D. BROWNELL. Patterns of weight loss and regain in wrestlers: Has the tradition changed? *Med. Sci. Sports Exerc.* 22:762-768, 1990.
15. STRAUSS, R. H., R. R. LANESE, and W. B. MALARKEY. Weight loss in amateur wrestlers and its effect on serum testosterone. *JAMA* 254:3337-3338, 1985.
16. UTTER, A. C. The new National Collegiate Athletic Association wrestling weight certification program and sport-seasonal changes in body composition of college wrestlers. *J. Strength Cond. Res.* 15:296-301, 2001.